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BUREAU OF SYSTEMS OPERATIONS

USER SATISFACTION PROJECT

INTERIM REPORT

MARCH 1984

GOVERNMENT DOCUMENTS  
COLLECTION

DEC 19 1984

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Elizabeth Rosenthal  
Project Director



### Contributors

The User Satisfaction Project has received the cooperation and special contributions of twenty-seven BSO staff who participated in individual orientation meetings, and of forty-nine individuals who use BSO services and who participated in group interviews. By agreement, these individuals remain anonymous.

Project activities presented in this interim report were supported by the efforts and expertise of the following current and former OMIS staff and consultants:

Debbie Armstrong	Judy Kingsley
Tim Aston	Tom Marx
Mary Jane Callahan	Bob Melia
Beth Corning	✓ Peter Nelson

Professor James Bailey, of Arizona State University, has been extremely generous in providing free consultation and encouragement on questionnaire design and data analysis.





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*Executive Office for Administration and Finance*

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TO: Gaspar Caso

FROM: Elizabeth Rosenthal, Special Assistant to the Director *BR.*  
Office of Management Information Systems

DATE: March 30, 1984

RE: Users' Satisfaction with Bureau of Systems Operations (BSO) Services

As you may know, to help BSO do a better job of meeting agencies' data processing needs, I am conducting regular, periodic interviews with BSO users. A report on the first set of interviews, which took place during the first quarter of FY'84, is enclosed.

This spring, in addition to conducting further interviews, I will be working with BSO staff and members of the user community to address problem areas identified in this report. As an initial step, I would like to hold a series of small, working meetings that will include review and discussion of report findings. If you are interested in participating, please give me a call at 7-3682.

I hope that you find this report of interest and of use. Do let me know your reactions.

Thank you.

BR/esc  
attachment





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## INTRODUCTION

What follows is an interim report of the User Satisfaction Project, an ongoing initiative of the Office of Management Information Systems (OMIS). This report summarizes project activities to date, and presents findings on the views and experiences of individuals at twelve state agencies that use information processing services provided by the Bureau of Systems Operations (BSO).

### Organization Overview

The Office of Management Information Systems (OMIS), part of the Commonwealth of Massachusetts' Executive Office of Administration and Finance, was established in 1979 by an Executive Order. OMIS is responsible for ensuring optimum utilization, maintenance and control of information processing systems established and owned by the Commonwealth. Information processing is defined to include both data processing and office automation equipment such as word processing, micro-computers, and electronic mail.

OMIS is organized into two major divisions, the Bureau of Systems Operations (BSO) and the Bureau of Systems Policy and Planning (BSPP).

BSO operates a major data center that serves approximately 60 state government organizations, including Administration and Finance and Human Services agencies, and the Legislature. The Bureau's mandate is to deliver timely, efficient and economically pragmatic solutions to meet the Commonwealth's information systems needs. BSO has a family of IBM and IBM-compatible mainframes that support over 1,500 on-line devices. BSO also performs software maintenance and system development activities for many of its users.

BSPP is charged by Executive Order and statute with oversight of all information processing procurements for the Commonwealth. The Bureau's primary



### Organization Overview (continued)

objective is to assist agencies in the implementation of automated information systems that will enable them to perform more efficiently and effectively. Its responsibilities include helping state agencies and state data centers (of which BSO is one) to develop data processing plans, and preparing a statewide data processing plan. BSPP provides assistance to agencies in the procurement of data processing equipment, systems, and services, and in defining data processing needs.

BSO and BSPP are supported by two other units, the Office of Administration and the Office of General Counsel.

### Project Overview

The BSO User Satisfaction Project began late in Fiscal Year 1983 as an initiative of the Director of OMIS. The Project entails determining users' perceptions of the quality of BSO services, identifying common problem areas, and developing responsive strategies to resolve these problems. The Project's overriding purpose is to support OMIS in carrying out its service mission.

The Project, which is intended to promote organizational development, was designed as an applied research effort, in which information on users' satisfaction with BSO would be obtained both through interviewing and through administering a questionnaire to appropriate personnel at agencies that receive BSO services. The questionnaire was intended to provide quantitative information about individuals' perceptions of BSO services in sufficient detail to isolate problem areas. The interview was intended to promote dialogue between a representative of OMIS and representatives of agencies using BSO services, and to obtain qualitative data on these individuals' experiences that would be of use







### Project Overview (continued)

in interpreting and responding to the questionnaire results. Research methods were employed so that any changes in BSO users' satisfaction over time could be reliably determined.

### Data Collection: First Quarter FY'84

During the first quarter of FY'84, group interviews were conducted with a total of forty nine participants from twelve agencies. (A listing of these agencies appears in Table 3 of Appendix C.) Group size, four on average, ranged from two to six participants. The interviews took about two hours and included time during which the questionnaire on users' perceptions of BSO services was administered; questionnaires were completed by forty five of the participants from eleven of the agencies.

All interviews were conducted by the Special Assistant to the Director of OMIS. In one case, at the suggestion of the agency, an analyst from the Bureau of Systems Policy and Planning (BSPP), who recently had been assigned to work with that agency, sat in on the interview.

### Methodology

Inevitably, a number of methodological issues have emerged during the course of designing and implementing the project. Because this interim report is intended as a management document, only the most directly relevant methodological concerns are addressed, here. These include questionnaire and interview instrument development and data analysis procedures, which are discussed in Appendix A. Overall project methodology will be reviewed in greater detail in a final report on the Project.



## FINDINGS

In reviewing the results reported below, it is important to remember that they were derived from data gathered during the first quarter of Fiscal Year 1984. (Data collection and analysis procedures are summarized in Appendix A.) These results cannot be assumed to reflect the current level of satisfaction with BSO, even among those who participated in the interviews conducted last July, August and September. Any number of changes within the participating user agencies and within BSO may have intervened to alter these users' perceptions of BSO services.

In fact, the User Satisfaction Project was launched as one of several efforts by the Director of OMIS to increase BSO's responsiveness to its user community, and some of the interview comments suggested that those efforts were being felt even as these interviews were being conducted. Furthermore, the project is intended to promote organizational development; therefore, when feasible, problems that were identified during an interview were brought at once to the attention of appropriate OMIS personnel.

To determine the extent to which BSO has been successful in responding to these problems and, more generally, the extent and direction of any change in users' satisfaction with BSO services will require a follow-up inquiry.

### Agency and Inter-Agency Satisfaction

#### Questionnaire Results by BSO Service Category:

The User Satisfaction Project questionnaire measures satisfaction in six BSO service categories. These categories are 1) technical assistance in problem determination and response, 2) technical assistance in teleprocessing applications, 3) technical assistance in data base/file management, 4) batch processing, 5) on-line processing, and 6) maintenance/enhancement of applications.





Agency and Inter-Agency Satisfaction (continued)

(Definitions of these categories appear in Table 1 of Appendix B.) Tables 4 and 5 in Appendix C present each agency's mean satisfaction rating for each category as well as the grand mean satisfaction score for each category. As these tables show, questionnaire respondents tended to be more satisfied than not with the services they received from BSO. Grand mean satisfaction scores for all six categories are to the left, or satisfied side of four, the neutral position on the seven point rating scale. Questionnaire responses indicate participants' slight satisfaction, overall, with the six BSO services surveyed.

Interview Findings:

On average, the grand mean satisfaction scores discussed above are marginally better than the more general measure of overall satisfaction with BSO obtained during each group interview. By contrast with questionnaire results, three of the groups interviewed gave ratings to the right, or dissatisfied side of the neutral position on the rating scale. Even so, the simple average of the ratings obtained in these interviews is 3.7, just to the left, or satisfied side of neutral.

A number of concerns were recurrently voiced, and clearly caused dissatisfaction (and frustration) among user participants. Those most frequently mentioned are summarized below. The order in which they are presented is not intended to indicate their relative importance to users.

- a. Inadequate capacity planning. Although a number of participants cited BSO's acquisition of the Amdahl as an important, positive event, they remained fearful that the pre-Amdahl situation would recur. They were aware that "capacity planning" was now part of BSO's vocabulary, but many expressed skepticism about the effectiveness of the BSO capacity planning function.





Agency and Inter-Agency Satisfaction (continued)

- b. Paucity of qualified staff. Although repeated references were made to BSO's able employees, many participants expressed frustration with BSO's lack of depth in staff qualified to meet user agencies' technical assistance needs. "We need a service bureau all day long, not just until one technical expert goes home at 3 p.m.," was a typical comment. Many participants expressed concern about the extent to which the Commonwealth's salary structure and civil service requirements constrain efforts to recruit and retain qualified data processing professionals. Some believed that passage of the Technical Pay Bill would address this concern, but others were skeptical about the bill's potential for longterm effectiveness.
- c. Poor--or poorly communicated--organizational structure. Individuals frequently associated this concern with their views of BSO staff (described in b. above). Some thought that competent BSO staff seemed handicapped by organizational constraints; some expressed frustration with the difficulty they experienced when attempting to contact the correct BSO employee, or even to identify that employee, in order to obtain technical assistance or some other service.
- d. Insufficient, ineffective procedural/paperwork requirements. Particularly in light of BSO's growth, no one took issue with the need for procedures, and some even applauded the Bureau's efforts to establish management (as distinguished from information) systems. However, a number of participants perceived existing procedures, like BSO's organizational structure, to be poorly conceived, poorly communicated, or both. Some participants expressed the view that paperwork requirements were operator- rather than user-oriented. A sample comment about BSO,



Agency and Inter-Agency Satisfaction (continued)

"They make us complete a morass of paperwork; we never get anything in writing from them," conveys the frustration that some user participants felt about this issue.

e. Poor internal communication. Participants observed poor communication between BSO staff on the 8th and the 16th floors, between the day and night shifts, and between state personnel and "03" consultants, and felt that poor communication in any of these three cases jeopardized delivery of effective service.

f. Insufficient collaboration with users. In addition to communication problems associated with organizational structure and procedures (c. and d. above), many participants recalled situations in which they had not been consulted about or even notified of an action that seriously affected them until after BSO had taken that action. Some of those interviewed were concerned that BSO staff tended to be defensive and seemed unwilling to recognize or draw upon the competence of user agencies' DP staff. Some users expressed regret that BSO staff were not more familiar with the workings of user agencies.

In addition, participants were asked specifically about the BSO User Group meetings. Their responses to this inquiry are presented below.

1

BSO User Group Meetings

Interview Findings:

Group ratings on satisfaction with BSO User Group Meetings were solicited during the interviews. By contrast with both questionnaire results and group interview ratings of overall satisfaction with BSO, these interview ratings indicate that

---

1

These are quarterly meetings conducted by BSO and should not be confused with either the EOHS Data Policy Group meetings or the PMIS User Group meetings.





BSO User Group Meetings (continued)

user participants tended to be more dissatisfied than not with BSO User Group meetings. Only one agency gave a rating to the left, or satisfied side of four, the neutral position on the rating scale. The simple average of the ratings given is 5.0, one position to the right, or dissatisfied side of neutral. The most frequently mentioned problems that participants had with the BSO User Group meetings are summarized below. The order in which they are presented is not intended to indicate their relative importance to users.

- a. Lack of Interest in Users' Problems. Although many of those interviewed acknowledged that users are regularly invited to air their concerns at these meetings, a number of participants questioned BSO representatives' real interest in users' problems. Responses were described by some as glib or defensive; "BSO just gives lip service. Our problems get explained away." Both the infrequency of the meetings (quarterly) and the erratic attendance of BSO managers and technical staff were believed by some to reflect BSO's essential lack of interest in their users.
- b. Wrong Forum for Problem Solving. A number of participants felt that the meetings were a good source of general information about BSO, but that they were too large and too public to be an effective forum for problem-solving. Some felt that to discuss one agency's problem fully would be an imposition on users from other agencies, or that it would be "airing dirty linen." Several individuals reported feeling intimidated; they were hesitant to say, in this forum, that they did not understand the technical jargon used by BSO staff. (Some questioned whether overly technical responses weren't a deliberate strategy by BSO staff to avoid real discussion of users' problems. See a. above.)





BSO User Group Meetings (continued)

- c. Lack of Planning. Some participants felt that an inadequate effort was made to plan the meetings. A number of individuals said that they were only notified about upcoming meetings at the last minute, and sometimes only by word of mouth. Meeting agendas were not always disseminated or apparently even set in advance; none of the participants reported ever having been involved in planning an agenda.
- d. Lack of Follow-Through. In addition to BSO's apparent lack of interest in users' problems during the meetings (see a. above) a number of participants commented on BSO's lack of subsequent responsive action. Users reported receiving no minutes of the User Group meetings. Most participants saw little effort on the part of BSO, as a result of these meetings, to develop responsive policies.

Relationship between Overall Usage and Satisfaction

Questionnaire Results by BSO Service Category:

On the theory that a service bureau would devote its attention primarily to meeting the needs of its major customers, questionnaire data were used to determine whether or not greater consumers of BSO services would be more satisfied than would lesser consumers. The cost of BSO services allocated to each agency<sup>1</sup> for Fiscal Year 1983 was used as a measure of that agency's usage.

A set of analyses performed to establish whether the amount of an agency's BSO usage was associated with that agency's satisfaction with BSO services produced two statistically significant results. First, satisfaction with technical assistance in teleprocessing applications is negatively correlated with overall usage. Second, satisfaction with BSO's batch processing services is positively correlated with overall usage. These results appear in Table 6 of Appendix C.

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These figures were obtained from "OMIS Chargeback System," a report required by the Commonwealth of Massachusetts, 1983 Acts and Resolves, Chapter 289, line item 1101-2300.



Agency Participants' Suggestions

At the end of each group interview, participants' suggestions and requests were solicited. Responses have been topically ordered, and are presented below as they were recorded.

Collaboration:

"Recognize users' experience and expertise. Let us feel that if we make constructive suggestions, you'll listen."

Interagency Agreement:

"Executive agreements that have substance, are realistic, and have accountability both ways."

Newsletter:

"We'd really like to see a BSO Users' newsletter."

"What about a BSO newsletter? Through electronic mail?"

Notification of Changes:

"Changes should be communicated by memo and over TSO."

"Please notify us in advance of any changes."

"If you're considering a change that's going to affect me, can we talk about it before you implement it?"

Technical Assistance:

"It would be very helpful if BSO had a set of specialists to whom agency people could go."

"A Help Desk would be a revolutionary improvement."

Training and Education:

"BSO is getting better at providing training for its users. That should be continued."





Agency Participant's Suggestions (continued)

"I'd like to see user agencies' top management receive education about BSO, so that [user DP personnel] don't get caught in the middle."

"I'd like to see an orientation to BSO for our clerical staff--a tour and a briefing--a simple explanation of BSO's hardware and of how [the clerical staff's] work relates to what BSO does."

"Our programmers, who live at BSO, should be eligible for any technical training you provide. We'd pay."

"Train your users to be good users."

User-Friendly Procedures:

"There needs to be a way to get disk storage without buying a whole disk drive or having to beg."

"Is there any way to cut back on BSO's paperwork requirements?"

"Set up a counter where users can walk in and get their jobs stamped in."

"If there's a problem with a job, please let me know right away, and let me know what I have to do."

"We should have a formally designated contact person in BSO; we rely on informal contacts."

User Group Meetings:

"Revamp these meetings."

"There should be smaller groups meeting more frequently."

"Let us know the agenda ahead of time."

"Send us minutes of the meetings."

"Don't use technical jargon."

"People should introduce themselves; wear name tags."

"This should be an opportunity for relationship-building."





## INTERPRETATIONS AND SUGGESTIONS

In this section, some interpretations of findings about users' satisfaction with BSO services are offered; these are followed by suggestions for possible responses.

### Agency and Inter-Agency Satisfaction

Recall that slight differences emerged between agencies' questionnaire and group interview satisfaction ratings. While both sets of ratings suggest that on average, users who participated in this project were slightly more satisfied with BSO services than not, interview ratings tended to be less favorable than questionnaire ratings. On average, interview ratings fell very close to the neutral position on the rating scale, and several agencies' interview ratings indicated overall dissatisfaction with BSO.

Although there is no explanation that indisputably accounts for differences between questionnaire and interview responses, two possible factors warrant mention here.

First, the User Satisfaction Project questionnaire measures satisfaction in terms of six service categories that OMIS senior management identified as important. It may be that user agency participants, when rating their satisfaction with BSO services during group interviews, took into account other services than those specified in the questionnaire. Interview ratings on satisfaction with the BSO User Group meetings support this contention.

Second, while statistical analyses of questionnaire responses treated each participant's ratings equally, in the group interviews some individuals may have deferred to others during the process of rating satisfaction with BSO.

Particularly in light of time constraints for reaching consensus necessitated by the limits of the interview, the considerable intra-agency variance in questionnaire responses supports this contention.



### Inter-Agency Differences

According to both questionnaire and group interview responses, the Office of the State Auditor was considerably more dissatisfied with BSO services than were participants from other agencies. (Tables 4 and 5 in Appendix C show what statistical analyses prove, that the questionnaire responses of the Office of the State Auditor differed significantly from the responses of the other agencies.)

In reflecting upon these findings, it is worth noting that, among participating agencies, the Office of the State Auditor is the newest member of the BSO user community. Furthermore, unlike many other BSO users, the Auditor's staff sought services directly from BSO Operations, rather than first working with BSO Systems & Programming staff. At the time of this data gathering effort, BSO Operations had no formal orientation for new users, and most project participants who reported having a formal BSO contact person identified a member of the Systems & Programming staff. During their group interview, the questions and comments of participants from the Office of the State Auditor demonstrated these users' need for some form of introduction to BSO Operations, and for a contact person within BSO to whom they could address their questions and from whom they could expect a response.

### BSO User Group Meetings

As reported in the Findings section, interview participants tended to be more dissatisfied than not with the BSO User Group meetings. These meetings received less favorable ratings than did BSO overall. In reflecting upon these scores, it seems worthwhile to consider the assumption, implicit in many of the participants' associated comments, that these meetings belong to and are the responsibility of BSO, rather than being users' group meetings.





### Relationship between Overall Usage and Satisfaction

Analysis of questionnaire data revealed that agencies' satisfaction with technical assistance in teleprocessing applications is negatively correlated and satisfaction with batch processing is positively correlated with usage. In interpreting these findings, it should be noted that although statistically significant, the statistical relationship between variables (usage and satisfaction category) is relatively weak in both of these cases. Furthermore, BSO usage was measured globally; within each agency's overall expenditure allocation, no attempt was made to discriminate among various types of usage. Under the circumstances, it would be premature to draw practical conclusions from these results at this time. However, it might prove useful to conduct a more detailed assessment in conjunction with implementation of the planned chargeback system.

### General Suggestions

In addition to the specific suggestions of project participants presented in the Findings section of this report, several general suggestions are offered here.

1. Review all concerns documented in this report, that user participants identified in their interview comments and/or through satisfaction ratings.
2. Develop an understanding of each concern, in sufficient depth to ensure the suitability of any subsequently planned, responsive action.
3. In developing such understanding and in developing responses, draw upon the experience and expertise of members of the user community.
4. Keep users informed of activities designed to enhance BSO service delivery; in particular, keep them up to date concerning the progress of





General Suggestions

activities designed to address their expressed concerns. (For example, users should be informed regularly about the status of the Technical Pay Bill. Recent comments by some who participated in the first quarter FY'84 interviews indicate that they have no knowledge of current implementation planning activities.)

5. Establish methods by which users' new and recurring concerns will be brought to the attention of appropriate OMIS staff on a regular basis, and will be addressed as outlined above.
6. Conduct periodic data collection to determine the extent and direction of any change in users' satisfaction with BSO services.



Appendix A

1. Questionnaire Development.
2. Interview Instrument Development.
3. Questionnaire Data Analysis.
4. Interview Data Analysis.





### Questionnaire Development

A literature search conducted at the end of Fiscal Year 1983 unearthed comparatively few articles that focus on computer user satisfaction; most published research in the area is devoted to the technical side of EDP. The lack of critical reviews of the literature is indicative of the relative infancy of this field. Only one article that was located dealt specifically with the concept of user satisfaction (others were concerned with the relationships between user behavior, user involvement, user attitudes and user background); a brief discussion of the measurement instrument developed by the authors of that article, and subsequently modified for use in the User Satisfaction Project, appears as Appendix A to this report.

1  
Bailey and Pearson developed the most comprehensive concept of user satisfaction, and also devoted more attention to reliability and validity than was reported in other articles. Realizing that there was no comprehensive, generally accepted definition of user satisfaction, these researchers attempted to identify every aspect of computer user satisfaction. After conducting an extensive literature search of their own (which included reviews of work by both psychologists and EDP researchers), and interviewing data processing professionals and middle manager users, Bailey and Pearson identified 39 factors relating to computer user satisfaction. Based on a statistical analysis, they reported a 0.99 probability that this was a complete list of the factors that comprise the domain of computer user satisfaction.



Questionnaire Development (continued)

Bailey and Pearson next borrowed, from the psychological literature on satisfaction, a model that takes into account both an individual's reaction to a given factor and the importance of that factor to the individual (Wanous and Lawler, 1972). They then applied a technique in which adjectives are used to measure perceptions (Osgood, et al, 1962). Bipolar adjective pairs (e.g. satisfactory vs. unsatisfactory, good vs. bad) were used to create a scale on which an individual's perceptions of each factor could be measured. A seven point scale was used to permit discrimination in the degree of "goodness" or "badness," for example, that an individual attached to a particular factor. The same method was used to measure an individual's perception of each factor's relative importance or unimportance.

An application of this technique, to measure user reaction to the "Communication" factor, appears below. (This example was included in the modified version of the Bailey and Pearson instrument administered in the User Satisfaction Project.)

Communication: The manner and methods of information exchange between users and computer services staff.

meaningful	___	___	___	___	___	___	___	meaningless
precise	___	___	___	___	___	___	___	vague
important	___	___	___	___	___	___	___	unimportant

A pilot test by Bailey and Pearson of their computer user satisfaction measurement instrument resulted in an overall reliability coefficient of 0.95, which is considerably greater than the reported reliability of any other measurement instrument located in the User Satisfaction Project literature search. Bailey and Pearson also tested the content, construct and external validity of their





Questionnaire Development (continued)

instrument, and reported results that ranged from "high" (0.91) to "satisfactory" (0.74).

The user satisfaction measurement instrument located during the literature search is a questionnaire composed of thirty nine factors, each of which is measured using four adjective pairs and an importance rating. For the User Satisfaction Project two types of modifications were made, the first to tailor the questionnaire specifically to BSO services, and the second to reduce the chance that, due to its sophistication and length, the questionnaire would confuse and/or alienate user agency respondents.

Design modifications were made in consultation with the Director of OMIS and BSO senior managers, and resulted in a questionnaire composed of fifteen of the original factors, organized under each of six BSO service categories. One further modification, the reduction in number of adjective pairs for each factor from four to two, was made by members of the project team. The service categories, factors and adjective pairs used in the User Satisfaction Project questionnaire are listed in Appendix B to this report.

Pilot-testing indicated that the modified questionnaire could be completed in approximately twenty minutes. Its subsequent administration during group interviews (rather than by mail) not only ensured that the greatest number of responses would be obtained, but also provided an opportunity for participants to seek clarification if they were confused by any aspect of the questionnaire, thus increasing the likelihood of reliable, valid measurement.





### Questionnaire Development (continued)

The modified questionnaire proved to be a highly reliable measurement instrument. The split half reliability coefficient was computed for satisfaction ratings in each of the six service categories, and was found to be 0.96 on average, with a range from 0.94 to 0.97. This is a modest improvement over the already high reliability of the original questionnaire.

### Interview Instrument Development

To facilitate content analysis of the information obtained during interviews, some of the interview questions were constructed with structured response choices, but because a primary intent of the interviews was to gather qualitative, anecdotal data, many of the questions were open ended, and participants were encouraged to "tell their stories."

Some of the questions were designed to elicit information on subjects that the literature search had revealed might be pertinent (e.g. user background).

A few questions were designed to obtain participants' satisfaction ratings, as well as their comments, about certain BSO services. These ratings could later be compared with the more rigorous measurement of users' satisfaction obtained using the questionnaire described above.

The group interview format facilitated information sharing among participants within each agency, as well as between these agency participants and the OMIS interviewer. Using general guidelines provided by OMIS, the selection of participants for each interview was made by the agency involved.



### Questionnaire Data Analysis

The following is a summary of the procedures employed for coding and analyzing questionnaire data. (BSO service categories, factors and adjective pairs included in the questionnaire are listed in Appendix B.)

Within each service category, user agency participants marked the importance of each of the fifteen factors on a scale that was later coded from one to seven. The extreme ratings of one (on the left) and seven (on the right) indicated most importance and least importance, respectively. The intermediate ratings, two through six, indicated intermediate degrees of importance. Thus, the lower the rating, the more important the participant considered that factor to be.

The middle or neutral position on the scale was coded four. This rating indicated that the associated factor was neither important nor unimportant to the individual respondent.

Participants could also respond that a factor was not applicable to them by checking a separate "N.A." space on the questionnaire form. In such cases, and in cases where people omitted a rating, the importance score for that factor was treated as missing, for data analysis purposes.

Mean (estimated average) importance ratings for categories were computed under two separate rules. The first was a generous rule, in which a score was calculated even if the individual had rated only one of the fifteen factors in the category. The second rule was a stringent one, in which a mean importance score was calculated only if the respondent had marked importance for at least eight factors, i.e. more than half of the factors used to describe the category. All statistical analyses were run under both rules. Where the test results were similar under the two rules, confidence increased that the findings were not spurious.





### Questionnaire Data Analysis (continued)

The procedure for calculating mean satisfaction ratings was first to determine the rating for each of two bipolar adjective pairs that described each factor. The rating for each pair was determined in the same manner as that used for importance, as described above. Each of these adjective pair ratings was then weighted, using the associated importance rating. Finally, from the weighted ratings a mean satisfaction score was calculated for each category.

Again, both a generous and a stringent inclusion rule were employed. Under the generous rule, the individual respondent only had to have rated one adjective pair and the importance for that factor. Under the stringent rule, the questionnaire had to have at least sixteen out of a possible thirty weighted adjective pair ratings in order to be included in the analysis.

### Interview Data Analysis

An analysis was performed of the qualitative data gathered during the group interviews. Comparisons were made among the responses of participants in different agencies to each of the interview questions; patterns were noted when they emerged.

Descriptive data were compiled, including data on secretariat affiliation, length of agency experience as a BSO user, agency and individual experience with other service bureaus, and participants' location in the organization. In conjunction with questionnaire data, these descriptive data were used to test hypotheses about users' satisfaction with BSO services.

Group ratings of satisfaction with BSO, in general, and with the BSO User Group meetings, in particular, were tabulated and converted to the same seven ordinal positions used to code questionnaire responses. Comparisons were then made between the interview and questionnaire ratings.



Interview Data Analysis (continued)

A list was compiled of the suggestions made by those who were interviewed.

Results from the analyses of both questionnaire and interview data are reported in the Findings section of this report.



Appendix B

Table 1. BSO Service Categories included in the User Satisfaction Project Questionnaire.

Table 2. Factors and Adjective Pairs included in the User Satisfaction Project Questionnaire.





Table 1

BSO Service Categories included in the User Satisfaction Project Questionnaire.

1. Technical Assistance in Problem Determination and Response: assistance with any information systems problems that a user has.
2. Technical Assistance in Teleprocessing Applications: assistance in the data communications area.
3. Technical Assistance in Data Base/File Management: consultation in the use of data base management systems.
4. Batch Processing: regularly scheduled production work; non-scheduled requests.
5. On-line Processing: inquiry or data entry input use via on-line terminal device.
6. Maintenance-Enhancement of Applications: program changes.



# Factors and Adjective Pairs included in the User Satisfaction Project Questionnaire

5. Technical competence: The computer technology skills and expertise exhibited by the BSO staff.

N.A. —

[illegible]

6. Communication: The manner and methods of information exchange between users and BSO staff.

N.A.

**meaningful:** \_\_ : \_\_ : \_\_ : \_\_ : \_\_ : \_\_ :  
precise: \_\_ : \_\_ : \_\_ : \_\_ : \_\_ : \_\_ :

**important:** : : : : :unimportant

7. Response/turnaround time: The elapsed time between a user-initiated request for computer-based service and a reply to that request. (Response time refers to elapsed time for terminal type request or entry; turnaround time refers to elapsed time for execution of a program submitted or requested by a user and the return of the output to that user.)

N.A.

**fast:** : : : : : : : : : :  
**consistent:** : : : : : : : : : :

**important:** : : : : :unimportant

8. Responsiveness: The elapsed time between a user-initiated request for technical assistance and a reply to that request.

**N.A.**           

fast: \_\_:\_\_:\_\_:\_\_:\_\_:\_\_:\_\_:\_\_:\_\_:slow  
consistent: \_\_:\_\_:\_\_:\_\_:\_\_:\_\_:\_\_:\_\_:inconsistent

**important:** : : : : :unimportant





13. Reliability: The consistency and dependability of the output information.

N.A.

[illegible][illegible][illegible]

14. Understanding of systems: The degree of comprehension that users possess about the computer-based information systems or services that BSO provides.

N.A.

high: \_\_ : \_\_ : \_\_ : \_\_ : \_\_ : \_\_ : low  
sufficient: \_\_ : \_\_ : \_\_ : \_\_ : \_\_ : \_\_

**important:**    :    :    :    :    :    :

15. Feeling of participation. The degree of involvement and commitment that users share with BSO staff and others toward the functioning of the BSO systems and services.

N.A.

[illegible]

**important:** : : : : :

N.A.

**timely:**\_\_:\_:\_\_:\_: :\_:\_:\_\_\_: :\_:\_:\_\_\_:  
**consistent:** :\_: :\_: :\_: :\_: :\_:

	:	:	:	:	:unimportant
important:	:	:	:	:	
important:	:	:	:	:	

	:	:	:	:unimportant
important:	:	:	:	
important:	:	:	:	



Appendix C

Table 3. User Satisfaction Project Agency Participants, 1st Quarter FY'84

Table 4. Agencies' Mean Satisfaction Ratings for Six Categories of BSO Services, computed using a generous inclusion rule.

Table 5. Agencies' Mean Satisfaction Ratings for Six Categories of BSO Services, computed using a stringent inclusion rule.

Table 6. Agencies' Overall Usage and Mean Satisfaction Ratings for Two BSO Service Categories.



Table 3

User Satisfaction Project Agency Participants, 1st Quarter FY'84

Executive Office of Administration and Finance

Executive Office of Human Services

Budget Bureau (BB)

Department of Public Health (DPH)

Comptroller's Division (CD)

Department of Public Welfare (DPW)

Department of Personnel Administration (DPA)

Department of Social Services (DSS)

Group Insurance Commission (GIC)

Department of Youth Services (DYS)

Office of Employee Relations (OER)

Massachusetts Rehabilitation Commission (MRC)

Other

1

Board of Registration (BR)

Office of the State Auditor (OSA)

1

Interview only (no questionnaires).





Table 4

1  
Agencies' Mean Satisfaction Ratings for Six Categories of BSO Services  
(Generous Inclusion Rule)

Agency	2 T.A. in Problem Deter-		2 T.A. in Teleprocessing Applications		2 T.A. in Data Base/ File Mgmt.		Batch Processing	On-Line Processing	Maintenance/ Enhancement of Applications
	mination/Response								
BB	2.6		2.3		3.2		2.3	2.3	3.0
CD	2.9		3.4		3.4		2.8	2.7	2.7
DPA	3.0		2.7		2.1		2.0	1.8	2.1
GIC	4.0		4.0		3.9		3.6	2.9	3.7
OER	3.6		---		---		3.2	---	2.7
DPH	4.0		3.6		3.2		3.5	2.8	4.0
DPW	3.8		4.6		3.7		2.7	3.3	3.4
DSS	2.5		3.0		3.1		2.0	2.6	3.2
DYS	3.3		3.0		3.0		3.8	2.3	3.6
MRC	2.2		1.1		2.0		1.7	1.7	---
OSA	5.6		---		5.2		4.7	4.1	---
GRAND MEAN	3.5		3.3		3.4		3.0	2.8	3.0

1    2    3    4    5    6    7  
very satisfied                      very dissatisfied

1  
Mean rating = estimated average, computed from the ratings of those users included in the questionnaire sample.



1  
Agencies' Mean Satisfaction Ratings for Six Categories of BSO Services  
(Stringent Inclusion Rule)

Agency	2 T.A. in Problem Deter- mination/Response	2 T.A. in Teleprocessing Applications	2 T.A. in Data Base/ File Mgmt.	Batch Processing	On-Line Processing	Maintenance/ Enhancement of Applications
BB	2.6	2.3	3.2	2.3	2.5	3.0
CD	3.0	3.4	3.4	2.9	2.7	2.8
DPA	3.0	2.7	2.1	2.0	1.8	1.7
GIC	3.5	3.6	2.9	3.6	2.9	3.7
OER	3.6	---	---	3.2	---	2.7
DPH	3.7	3.2	2.2	3.1	2.0	---
DPW	3.8	4.3	3.7	2.7	3.3	3.4
DSS	2.5	3.2	3.0	2.0	2.1	---
DYS	3.3	3.0	2.9	3.8	2.3	3.6
MRC	2.2	1.1	2.0	1.7	1.7	---
OSA	5.5	---	5.0	5.4	4.7	---
GRAND MEAN	3.4	3.1	3.2	3.0	2.7	3.0

1 2 3 4 5 6 7  
very satisfied very dissatisfied

1  
Mean rating = estimated average, computed from the ratings of those users included in the questionnaire sample.

2  
T.A. = Technical Assistance.





# Agencies Overall Usage and Simple Mean Satisfaction Ratings for Two BSO Service Categories

Agency	Overall BSO Usage, FY '83 (in dollars)	Technical Assistance in Teleprocessing Applications (Generous Inclusion Rule)	Technical Assistance in Teleprocessing Applications (Stringent Inclusion Rule)
DPW	6,526,784.72		
CD	1,231,876.98	3.4	3.4
DPA	515,856.55		
DSS	458,296.10		
MRC	227,725.39		
DPH	126,451.00		
BB	83,469.58	2.5	2.4
DYS	7,794.23		

Agency	Overall BSO Usage, FY'83 (in dollars)	Batch Processing (Generous Inclusion Rule)	Batch Processing (Stringent Inclusion Rule)
DPW	6,526,784.72		
CD	1,231,876.98		
DPA	515,856.55	2.6	2.6
DSS	458,296.10		
GIC	352,709.70		
DPH	126,451.00		
BB	83,469.58		
OER	39,971.36	3.5	3.6
OSA	10,286.02		
DYS	7,794.23		

1  
Simple Mean = simple average, calculated from the categorical ratings of agencies with relatively higher and lower overall usage.

